

SECTION C

DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

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SECTION C STATEMENT OF WORK

I. Objective

The primary objective of this contract is to design, construct, and operate conversion facilities on DOE property at Paducah, Kentucky, and Portsmouth, Ohio. These facilities will convert DOE's inventory of depleted uranium hexafluoride (DUF_6) now located at the Paducah Gaseous Diffusion Plant, the Portsmouth Gaseous Diffusion Plant, and the East Tennessee Technology Park (ETTP) to triuranium octoxide (U_3O_8), uranium dioxide (UO_2), uranium tetrafluoride (UF_4), uranium metal, or some other stable chemical form acceptable for transportation, beneficial use/reuse, and/or disposal. Any conversion product form must have an assured, environmentally acceptable path for final disposition. A related objective is to provide cylinder surveillance and maintenance (S&M) of the DOE inventory of DUF_6 , low-enrichment uranium (LEU) hexafluoride (UF_6), natural assay UF_6 , and empty and heel cylinders in a safe and environmentally acceptable manner.

II. Background

A. History of Uranium Enrichment

1. DOE has the programmatic responsibility for the Government's DUF_6 inventory as the successor of the Atomic Energy Commission and the Energy Research and Development Administration.
2. DUF_6 results from the process of making uranium suitable for use as fuel for nuclear reactors or military applications. The use of uranium in these applications requires increasing the proportion of the ^{235}U isotope found in natural uranium, which is approximately 0.7%, through an isotopic separation process called uranium enrichment.
3. Gaseous diffusion was the enrichment process used to create this inventory. This process requires uranium in the form of UF_6 , a chemical compound consisting of one atom of uranium combined with six atoms of fluorine. It can be a solid, a liquid, or a vapor, depending on its temperature and pressure. It is used for the gaseous diffusion process primarily because it can conveniently be used in the vapor form for processing, in the liquid form for filling or emptying containers or equipment, and in the solid form for storage and transportation. At atmospheric pressure UF_6 is a solid at temperatures below 134°F (57°C) and a vapor at temperatures above 134°F. Solid UF_6 is a white, dense, crystalline material that resembles rock salt.
4. In the gaseous diffusion process, a stream of heated UF_6 gas is separated into two parts: one enriched in ^{235}U and the other depleted in ^{235}U . The enriched UF_6

is used for manufacturing commercial reactor fuel, which typically contains 2–5% ^{235}U , or for military applications (e.g., naval reactor fuel), which requires further enrichment of ^{235}U . The DUF_6 , which typically contains 0.2–0.4% ^{235}U , is stored as a solid in large metal cylinders at the gaseous diffusion facility.

5. Large-scale uranium enrichment in the United States began as part of atomic bomb development by the Manhattan Project during World War II. Uranium enrichment activities were subsequently continued under the U.S. Atomic Energy Commission and its successor agencies, including DOE. The K-25 Plant in Oak Ridge, Tennessee (now East Tennessee Technology Park, or ETTP), was the first of three gaseous diffusion plants constructed to produce enriched uranium; the other two plants are in Paducah, Kentucky, and Portsmouth, Ohio. The K-25 Plant ceased operations in 1985, but uranium enrichment continues at both the Paducah and Portsmouth sites. These two plants are now operated by the United States Enrichment Corporation (USEC), created by the Energy Policy Act of 1992, which led to privatization of the uranium enrichment program.

B. Storage and Disposition of Depleted Uranium

1. Since the 1950s, DUF_6 has been stored at Oak Ridge, Paducah, and Portsmouth in large steel cylinders. Several different cylinder types, including 137 nominal 19-ton cylinders (Paducah) made of former UF_6 gaseous diffusion conversion shells, are in use, although the vast majority of cylinders have a 14-ton (12-metric-ton) capacity. The cylinders are typically 12 ft (3.7 m) long by 4 ft (1.2 m) in diameter, with most having a wall thickness of 5/16 in. (0.79 cm) of steel. Similar but smaller cylinders are also in use. During storage, a cylinder contains solid DUF_6 in the bottom and DUF_6 gas at less than atmospheric pressure. The DUF_6 cylinders managed by DOE at the three sites are typically stacked two cylinders high in large areas called yards.
2. The chemical and physical characteristics of DUF_6 pose potential health risks, and the material is handled accordingly. Uranium and its decay products in DUF_6 in storage emit low levels of alpha, beta, gamma, and neutron radiation. The radiation levels measured on the outside surface of filled DUF_6 storage cylinders are typically about 2 to 3 millirem per hour (mrem/h), decreasing to about 1 mrem/h at a distance of 1 ft (0.3 m). If DUF_6 is released to the atmosphere, it reacts with water vapor in the air to form hydrogen fluoride (HF) and a uranium oxyfluoride compound called uranyl fluoride (UO_2F_2). These products are chemically toxic. Uranium is a heavy metal that, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if it enters the bloodstream by means of ingestion or inhalation. HF is an extremely corrosive gas that can damage the lungs and cause death if inhaled at high enough concentrations.

3. Cylinders are stored with minimum risks to workers, members of the general public, and the environment at the Paducah, Portsmouth, and ETTP sites. DOE maintains an active cylinder management program to improve storage conditions in the cylinder yards, to monitor cylinder integrity by conducting routine inspections for breaches, and to perform cylinder maintenance and repairs to cylinders and storage yards, as needed.
4. The Department has characterized the presence of transuranic and technetium contamination in the depleted UF_6 cylinders using existing process knowledge and additional sampling of cylinders. The results of this characterization show non-detectable or very low levels of transuranics dispersed in the depleted UF_6 stored in the cylinders. However, there are higher levels of transuranics associated with “heels” remaining in a small number of cylinders formerly used as recycled uranium feed cylinders. The total quantities of transuranics and technetium contained in the entire inventory of depleted UF_6 fall within the DOE Category 3 nuclear facility quantities.
5. As the inventory of DUF_6 cylinders age, some cylinders have begun to show evidence of external corrosion. To date, ten cylinders have developed holes (breaches). However, since DUF_6 is a solid at ambient temperatures and pressures, it is not readily released from a cylinder following a leak or breach. When a cylinder is breached, moist air reacts with the exposed DUF_6 solid and iron, resulting in the formation of a dense plug of solid uranium and iron compounds and a small amount of HF gas. This plug limits the amount of material released from a breached cylinder. When a cylinder breach is identified, the cylinder is typically repaired or its contents are transferred to a new cylinder.
6. DOE has responsibility for continued management of the DUF_6 cylinders stored at the Paducah, Portsmouth, and ETTP sites. Since 1990, the Department's cylinder management has focused on the ongoing surveillance and maintenance (S&M) of the cylinders containing DUF_6 , which involves cylinder inspections, recoatings, and relocations to ensure that DUF_6 is safely stored pending its ultimate disposition. Public Law (P.L.) 105-204, signed by the President in July 1998, directed the Secretary of Energy to prepare and submit to Congress a plan to ensure that all funds accrued on the books of USEC for the disposition of DUF_6 will be used for the construction and operation of plants to treat and recycle DUF_6 consistent with the National Environmental Policy Act (NEPA). The Department has responded to the law by initiating a procurement action through release of a Request for Expressions of Interest on March 4, 1999, and issuing the *Final Plan for the Conversion of Depleted Uranium Hexafluoride* in July 1999. This contract furthers the procurement action undertaken by DOE.

7. The Department's *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride*, dated April 1999, described the preferred alternative for managing DUF_6 . The Record of Decision (ROD) concerning the Department's decision on the long-term management and use of DUF_6 was issued in August 1999.

C. Site Information

1. The Paducah Gaseous Diffusion Plant is located in western McCracken County, 15 miles west of Paducah, Kentucky, between U.S. Highway 60 and the Ohio River and consists of approximately 115 buildings and structures. One of these buildings, C-340, converted DUF_6 to UF_4 and UF_4 to uranium metal, circa 1953-1977. Building C-340 is not functional, is in a degraded condition, and is scheduled for decontamination and demolition. A single rail system serves the plant. DOE leases facilities required for the gaseous diffusion operation to USEC. That portion of the site leased to USEC is regulated by the Nuclear Regulatory Commission (NRC). The remainder of the site is managed by a DOE prime Contractor. There are and have been some additional third-party tenants leasing unused facilities. For a description of DOE owned Paducah cylinder yards relevant to this contract, see Section J, Attachment A, and Reference A. Although no site is selected until National Environmental Policy Act (NEPA) activities have been completed and a record of decision has been issued, the candidate site for the conversion plant is the flat grassy field between the main cylinder storage yard and the main road coming into the south end of the plant and adjacent wooded area. A map of the Paducah Plant, existing cylinder yards, and proposed conversion facility site, is provided in Reference B. Relevant site characterization information is provided in Section J, Attachment G. A portion of the candidate conversion facility site is designated a Solid Waste Management Unit (SWMU 194) in the Paducah Federal Facilities Agreement and is subject to evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Contractor should assume the candidate site will be suitable for construction and operation under an industrial land-use scenario.
2. The Portsmouth Gaseous Diffusion Plant is located 23 miles north of Portsmouth near Piketon, Ohio, on U.S. Highway 23. A single rail system serves the plant. DOE leases facilities required for the gaseous diffusion operation to USEC. That portion of the site leased to USEC is regulated by NRC. The remainder of the site is managed by a DOE prime Contractor. There are and have been some additional third-party tenants leasing unused facilities. For a description of DOE owned Portsmouth cylinder yards relevant to this contract, see Section J, Attachment B, and Reference C. Although no site is selected until National Environmental Policy Act (NEPA) activities have been completed and a record of decision has been issued, the candidate site for the conversion

plant is the lithium warehouse area, an area surrounding and including warehouses X-744S, T and U. The candidate conversion site, in general, is bounded on the west side by an unnamed road west of X-744T; on the north and east side by a truck access road; and on the east and south side by a dirt construction road. Excluded from this area are Buildings X-616 (USEC), X-106B, and X-106C (USEC). A general map of the Portsmouth Plant, existing cylinder yards, and candidate conversion facility site is provided in Reference B. For information regarding relevant site characterization, see Section J, Attachment G.

3. The East Tennessee Technology Park (ETTP) is located within the city limits of Oak Ridge, Tennessee, on State Highway 58. The site is served by a single rail system. Commercial firms are located on the site as part of the ETTP reindustrialization activities. Several DOE prime Contractors are located on the site. A general map of ETTP and existing cylinder yards is provided in Reference B. For a description of DOE owned ETTP cylinder yards relevant to this contract, see Section J, Attachment C, and Reference D.

III. Project Management

A. Management

1. The Contractor shall ensure effective performance of all activities necessary to (a) produce the conceptual, preliminary, and final designs; (b) execute the construction; (c) operate the DUF₆ conversion facilities; and (d) carry out the cylinder management activities. The Contractor shall prepare a **Project Management Plan (PMP) (D-1)** for approval by the Contracting Officer or designee. The PMP will describe the purpose, scope, primary participants, and proposed methods of accomplishment. The Contractor shall comply with the approved PMP. Major elements of the PMP shall include the following:
 - a) *Management Organization and Responsibilities.* Describe the functional organization charts depicting the project team. The significant project interfaces and lines of responsibility, authority, accountability, and communications should be identified and described. This section deals with how the organization will function—not just the administrative reporting lines. The principal responsibilities of the primary functional organizations should be delineated.
 - b) *Work Plan.* Describe in detail how the work will be accomplished, including the use of subcontractors consistent with provisions in the clause entitled “Subcontracting Requirements” in Section H, through a project summary and a work breakdown structure (WBS) that reflects the key project elements. This WBS should provide the basis for the organization of work, cost

estimating, and project tracking. Describe the systems to be used to manage, measure, plan, and control the costs of each portion of the contract.

- c) *Schedule*. Present in logic diagram format a project schedule keyed to the WBS. All efforts required to execute the project are to be reflected in the schedule, including, but not limited to design and construction activities, procurement, cylinder surveillance and maintenance, transportation of ETTP cylinders to Portsmouth, disposition of heels and empty cylinder, conversion operation, and transportation and disposition of conversion products and wastes. The logic diagram will reflect the project's critical path and all major activities, milestones, key interfaces and decision points, and documents (environmental documentation, safety analysis, permitting, etc.).
 - d) *Configuration Management*. Describe the configuration management and control plans that shall be implemented at the inception of the project. These plans will include descriptions of the appropriate quality assurance elements, control boards, and methodology for managing the technical and cost aspects of the project. At a minimum, the following shall be required:
 - (1) Change thresholds and respective approval authorities will be established, and documented records will be maintained for proposed changes and actions.
 - (2) Changes to approved, but non-baseline data elements will also be done in a manner that maintains traceability.
 - (3) Configuration management will be applied only to those baseline data elements specifically identified as configuration items.
 - e) *Site Interfaces*. Describe how the Contractor will interface with USEC and other on-site Contractors for the provision of shared or purchased services, utilities, and equipment. Transition of the cylinder S&M activities from the incumbent prime Contractor to the Contractor shall be discussed.
 - f) *Monthly Cost Reports*. Describe the approaches and tools that will be used to maintain control of scope, cost, and schedule and to manage regulatory interfaces during the project lifetime. The Contractor shall meet the reporting requirements specified in Section B.
2. The Contractor shall support DOE in the performance of external and internal Independent Project Reviews (prior to the start of final design and prior to the start of construction), monthly project reviews, monthly program reviews, and any other reviews by HQ or other government entities, i.e., GAO, IG, etc., related to this project.

B. National Environmental Policy Act (NEPA)

1. DOE will prepare necessary NEPA documentation covering all activities described in the Statement of Work in compliance with 10 CFR 1021 and 40 CFR 1500-1508. Unless DOE specifically decides otherwise, DOE will not issue the notice-to-proceed on final design until NEPA review(s) (i.e., environmental impact statement(s)) are completed and a Record of Decision has been issued. DOE anticipates a duration of NEPA activities of 16 months from award of this contract.
2. The Contractor shall support the NEPA compliance activities of the DOE. The support will include, but may not be limited to, responding to questions from the NEPA compliance team, sending one or more representatives to the EIS public scoping meetings and draft EIS hearings, and providing updated data to the NEPA team at two intervals. The **Initial NEPA Data (D-2)**, after contract award, involves updating of the NEPA data provided in the Contractor's proposal. The **Updated NEPA Data (D-3)** involves updating the design and safety analysis data that had been provided to the NEPA team at the time the draft EIS was prepared. The updated data would be used in the preparation of the final EIS. In particular, the Contractor shall provide descriptions and the environmental releases for one or more accidents belonging to the following four frequency categories; less than 0.000001 per year, between 0.000001 and 0.0001 per year, between 0.0001 and 0.01 per year, and greater than 0.01 per year. The accidents designated in each frequency category should provide upper bound estimates on the quantities of radionuclides and other hazardous constituents released to the environment.

C. Regulatory Management

1. The Contractor shall be responsible for regulatory and permitting activities required by the contract. The Contractor shall submit for the approval of the Contracting Officer or designee a **Regulatory and Permitting Management Plan (D-4)** and shall provide updates to this plan, as needed. This plan shall describe the strategy for ensuring that the facilities are constructed and operated in accordance with applicable requirements as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I. The Contractor shall include in the plan a schedule of regulatory and permitting actions. The schedule shall identify major milestones and all critical actions that are necessary to ensure that all licenses and permits have been obtained.
2. The Contractor shall acknowledge the following requirements in the Regulatory and Permitting Management Plan:
 - a) DOE entered into a Consent Order with the Department of Environment and Conservation of the State of Tennessee (Section J, Attachment D) with respect to the management of the UF_6 stored at the ETTP site. The Contractor shall comply with the requirements of the Consent Order dated February 8, 1999. In addition, at the request of DOE, the Contractor shall

become a party-signatory to the Consent Order with the Department of Environment and Conservation of the State of Tennessee, prior to undertaking any cylinder-related activities at ETPP.

- b) DOE entered into an agreement with the Ohio EPA for the management of the depleted uranium stored at the Portsmouth site (Section J, Attachment E). This agreement, dated February 24, 1998, is entitled "Ohio EPA Director's Final Findings and Orders" (DFF&O). The DFF&O outlines the management, S&M activities, inspection requirements, and other requirements for the DUF₆ storage yards and cylinders owned by DOE at the Portsmouth site. The Contractor shall comply with the requirements of the DFF&O. The Contractor shall become a party-signatory to the DFF&O prior to undertaking any cylinder-related activities covered by the DFF&O.
- c) At the request of DOE, the Contractor shall negotiate in good faith and become a party-signatory to such future regulatory agreements or orders as DOE may deem appropriate for the work performed pursuant to this contract.

D. Quality Assurance

The Contractor is responsible for assuring that quality is integrated into all aspects of the work. The Contractor shall prepare a **Project Quality Assurance Plan (PQAP) (D-5)** for approval by the Contracting Officer or designee. The plan shall be developed and executed in accordance with 10 CFR 830.

E. Conversion Product Management

The Contractor is responsible for and shall perform all activities related to conversion products which are to be used/reused. These activities include product generation, transportation, storage, packaging, and disposition. The Contractor shall prepare and execute a **Conversion Product Management Plan (D-6)** for the management of all product generated for use/reuse. This plan shall describe how each identified product is generated and how it is to be managed from the point of generation to disposition. The plan shall include the quantities, methods, and timetables for the management of each product stream to be generated. The Conversion Product Management Plan shall be submitted to the Contracting Officer or designee for review and approval prior to the generation of any product. The plan shall be maintained and revised whenever changes are made that affect the management of product. All changes to the plan shall be subject to DOE approval by the Contracting Officer or designee.

F. Waste Management

The Contractor is responsible for and shall perform all activities related to waste management which include waste generation, transport, storage, treatment, waste minimization, waste certification, packaging, and disposal. The Contractor shall prepare a **Waste Management Plan (D-7)** for the management of wastes, that identifies all of the wastes to be generated. This plan shall describe how each

identified waste is generated and how it is to be managed from the point of generation to disposal. The plan shall include the quantities, methods, and timetables for the management of each waste stream to be generated. The Waste Management Plan shall be submitted to the Contracting Officer or designee for review and approval prior to the generation of any wastes. The plan shall be maintained and revised whenever changes are made that affect the management of wastes. All changes to the plan shall be subject to DOE approval by the Contracting Officer or designee. The plan shall consider the management of radioactive waste, mixed waste, hazardous waste, and sanitary/industrial waste as outlined below.

- a) For the management of radioactive waste and/or the radiological component of mixed waste generated by the project, the Contractor shall be subject to the Contractor Requirements Document of DOE Order 435.1 (Attachment 1 to DOE Order 435.1). Under the requirements of this document, the Contractor shall systematically plan, document, execute, and evaluate the management of DOE radioactive waste and/or the radiological component of mixed waste in accordance with DOE Order 435.1 as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I. In so doing, the Contractor shall protect the public, the environment, and workers by maintaining exposures to radiation and radiological contamination as low as reasonably achievable.
- b) The Contractor shall function as a generator of waste for the management of any hazardous, sanitary/industrial waste, or hazardous component of mixed waste associated with the proposed project. The responsibility for hazardous waste management, sanitary/industrial waste management, and hazardous component of mixed waste management rests with the Contractor. As the responsible party, the Contractor shall ensure that all hazardous and sanitary/industrial wastes, and hazardous components of mixed waste, are managed in compliance with the Resource Conservation and Recovery Act (RCRA) and with applicable regulations as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I.

G. Integrated Safety Management

- 1. Protection of workers, the public, and the environment are fundamental responsibilities of the Contractor and a critically important performance expectation. The Contractor's environment, safety and health (ES&H) program shall be operated as an integral, but visible, part of how the organization conducts business. A key element is implementing DOE Policy 450.4, "Safety Management System Policy," including prioritizing work planning and execution, establishing clear ES&H priorities, and allocating the appropriate level of trained and qualified resources to address programmatic and operational considerations. The Contractor shall ensure that cost reduction and efficiency efforts are fully compatible with ES&H performance.
- 2. The Contractor shall perform all activities in compliance with applicable health, safety, and environmental laws, orders, regulations, and national consensus standards; and governing agreements, permits, and orders executed with

regulatory and oversight government organizations. The Contractor shall take necessary actions to preclude serious injuries and/or fatalities, keep worker exposures and environmental releases as low as reasonably achievable below established limits, minimize the generation of waste, and maintain or increase protection to the environment, and public and worker safety and health.

3. Incorporating integrated line management, the Contractor shall put in place a system that clearly communicates the roles, responsibilities, and authorities of line managers. The Contractor shall hold all line managers individually accountable for implementing necessary controls for safe performance of work in their respective areas of responsibility. The Contractor shall establish effective management systems to identify deficiencies, resolve them in a timely manner, ensure that corrective actions are implemented (addressing the extent of conditions, root causes, and measures to prevent recurrence), and prioritize and track commitments and actions. The Contractor shall consider ES&H performance in selection of its subcontractors and incorporate ES&H requirements into subcontracts.
4. The Contractor shall develop and execute an **Integrated Safety Management System Plan (D-8)**. The plan shall be submitted to DOE for approval by the Contracting Officer or designee. The Contractor shall provide updates to this plan, as needed. The plan shall be prepared in accordance with the clause entitled "Integration of Environment, Safety, and Health into Work Planning and Execution" in Section I. Documentation of the plan shall describe how the Contractor will (1) define the scope of work; (2) identify and analyze hazards associated with the work; (3) develop and implement hazard controls; (4) perform work within controls; and (5) provide feedback on the adequacy of controls and continue to improve safety management. Prior to the development of this plan, the Contractor shall negotiate with the DOE the appropriate set of Work Smart Standards (WSS) and Standards/Requirements Identification Documents (S/RIDs). The plan shall identify proposed safety standards, describe why those safety standards were chosen, describe the implementation process for the proposed safety standards, demonstrate the administrative and management processes and infrastructure that support implementation of the proposed safety standards, and describe the approach to management of the regulatory process. The Contractor shall manage and perform work in accordance with this plan.

H. Radiation Protection

The Contractor shall be fully responsible for radiation protection and shall develop and execute a **Radiation Protection Plan (D-9)** in accordance with 10 CFR 835.

I. Security

The Contractor shall prepare and execute a **Site Security Plan (D-10)**. The Contractor shall provide updates to this plan, as needed. This document shall be a

compendium of plans for meeting the DOE safeguards and security requirements. The plan shall include the Contractor's methodology for physical protection of the conversion facilities, information security, and personnel security. The Site Security Plan shall be prepared in accordance with the DOE Order 470 series requirements as they apply to the facilities that are planned as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I. The plan shall include protection of information from disclosure pursuant to Export Controlled Information (ECI) in accordance with 15 CFR 774 and Unclassified Controlled Nuclear Information (UCNI) requirements in 10 CFR 1017. The plan shall also include a sabotage vulnerability assessment covering all aspects of facility operation which might have an unacceptable impact on personnel, the public, or the environment. The Site Security Plan shall be coordinated with other on-site activities to ensure adequate protection of the conversion facilities and uranium-bearing materials. The DOE Contracting Officer or designee must approve the Site Security Plan.

J. Material Safeguards

The Contractor shall prepare and execute a **Nuclear Materials Control and Accountability Plan (D-11)** in accordance with DOE Order 474.1 and DOE Manuals 474.1-1 and 474.1-2 as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I. The Contractor shall provide updates to this plan, as needed. The plan shall include the Contractor's methodology for material control and accountability for uranium feed and conversion products. The DOE Contracting Officer or designee must approve the Nuclear Materials Control and Accountability Plan prior to the Contractor's assuming cylinder surveillance and maintenance responsibilities.

IV. Facility Planning

A. Design Bases

1. Two conversion facilities shall be built, one at the Paducah Gaseous Diffusion Plant and one at the Portsmouth Gaseous Diffusion Plant, each producing the same depleted uranium product. Although no site is selected until National Environmental Policy Act (NEPA) activities have been completed and a record of decision has been issued, the candidate site at the Portsmouth Gaseous Diffusion Plant shall convert the DUF_6 inventory stored at that site and the DUF_6 inventory from the ETTP site, and the candidate site located at the Paducah Gaseous Diffusion Plant shall convert the DUF_6 inventory stored at the Paducah site. The conversion facilities shall be capable of processing safely DUF_6 cylinders, irrespective of size, shape, condition, and/or contents identified in the Cylinder Information Database (CID), Reference E, and in the Memorandum of Agreement Between the Department of Energy and the United States Enrichment Corporation, relating to depleted uranium, dated June 30, 1998 (Reference F), at a rate such that the total DUF_6 inventory at all three sites could reasonably be converted and dispositioned in no longer than 25 years after conversion operations start, subject to constraints of projected funding levels.

Federal, state, and local codes in affect during the design period shall govern. Design shall incorporate aspects that will facilitate the efficient and economical decontamination, decommission, and demolition of the facilities. There is no requirement that identical designs be used for the two conversion plants; however, the Contractor shall endeavor to take full advantage of the savings that can accrue from common procurement and construction actions, within the constraints of the varying regulatory requirements.

2. As a result of enrichment of recycled uranium in the early years of gaseous diffusion, some of the depleted UF₆ inventory is contaminated with small amounts of technetium and the transuranic elements plutonium, neptunium, and americium. Transuranic contamination in the UF₆ cylinders will exist as fluoride compounds that are both insoluble in liquid UF₆ and nonvolatile, but capable of being entrained from the cylinders during feeding of UF₆. The transuranic contamination will exist primarily as (1) small particulates more or less uniformly dispersed throughout the UF₆ contents, and (2) small quantities of consolidated residues ("heels") from the original feed stock to the cascades present in a relatively small but unknown number of cylinders. Technetium contamination will exist as fluoride and oxyfluoride compounds that are stable and partially volatile and will be present both uniformly dispersed throughout the UF₆ and in the "heels" material referred to previously.
3. The UF₆ contaminated with transuranic elements and technetium at the concentrations expected to be encountered can be safely handled. Table 1 shows values of the maximum expected concentrations of transuranic isotopes and technetium dispersed throughout the UF₆ in the storage cylinders. Table 2 shows values of the maximum expected concentration of transuranic and technetium contamination in nonvolatile residues ("heels") that are present in a small but unknown number of the cylinders. This "heels" material will remain in these cylinders after they are emptied.

Table 1. Bounding concentrations of dispersed transuranic and ⁹⁹Tc contamination in the DUF₆ tails cylinders

Contaminant	ppb _U
²³⁸ Pu	0.00012
²³⁹ Pu	0.043
²³⁷ Np	5.2
⁹⁹ Tc	15.9
²⁴¹ Am	0.0013

Table 2. Bounding concentrations of transuranic and ⁹⁹Tc contamination in DUF₆ feed heels material present in some cylinders

Contaminant	ppb _U
²³⁸ Pu	5
²³⁹ Pu	1,600

²³⁷ Np	54,000
⁹⁹ Tc	5,700,000
²⁴¹ Am	0.57

4. Table 3 shows values of the maximum expected total quantities of plutonium, neptunium, and technetium that can be contained in all of the depleted UF₆ inventory at all three sites.

Table 3. Maximum quantities of transuranics and technetium in DUF₆ inventory	
Radionuclide	Grams
Pu	24
Np	17,800
Tc	804,000

5. The Contractor is responsible for any additional characterization necessary to support design activities.

B. System Requirements

The Contractor shall prepare and maintain a **System Requirements Document (SRD) (D-12)** to define the overall technical baseline of the project. The SRD shall be submitted to the DOE Contracting Officer or designee for approval. This document shall describe the input and feed materials; the processing steps; all products, and wastes to be generated by the facilities; the design life for the plant and specific primary components and systems; any known operational constraints; the production rates; and the operational basis (number of shifts, batch systems or continuous, etc.). The SRD draws on the information provided in the Contractor's proposal, and the requirements for the project schedule, cost, and method of accomplishment. The SRD is the technical reference base establishing and preserving the functional requirements, and it will be updated throughout the life of the project and provided to DOE for approval by the Contracting Officer or designee annually. A typical outline of the information included is as follows:

- a) Mission Statement;
- b) System Description (narrative and flow diagram);
- c) Functional/Performance Requirements;
- d) Interfaces;
- e) Unique Project Constraints (process rate, cylinder transport);
- f) Technical Uncertainties and Contingencies;

- g) Permitting Requirements; and
- h) Requirements Verification (those things needed to verify that requirements are met).

C. Conceptual Design

1. Conceptual design is the initial formal project design phase. The Contractor shall develop on a site-specific basis the initial engineering bases and design criteria for a project design satisfying the functional requirements and performance criteria outlined in the SRD and design bases. Conceptual design activities are dedicated to:

- a) Development of the design concept and basis for initiation of preliminary physical design,
- b) Establishment of a project baseline, and
- c) DOT certification of cylinder overpack design, if pursued.

Completion of the Conceptual Design will be documented using **Conceptual Design Report (CDR) Packages (D-13)**. The Contractor shall produce separate CDR packages for each facility (Portsmouth and Paducah) using the same format. The CDR shall include, but is not limited to, the project criteria and design parameters for all engineering disciplines, identification of applicable codes and standards, quality assurance requirements, environmental studies, materials of construction, space allowances, energy conservation features, health and safety, safeguards, and security requirements and any other features or requirements necessary to describe the project. The CDRs shall be organized to allow easy assessment of facilities, systems, hardware, components, operations, and maintenance.

2. The Contractor shall fully explore conversion process and operations to validate the technical merit, define the operational characteristics and constraints, identify any remaining uncertainties and what steps shall be taken to eliminate those, and define the method of accomplishment for the remainder of the project. The Contractor shall submit information and support a full review of the conceptual design at approximately 30% and 80% completion (and other specific reviews as directed by DOE). These reviews shall include, but not be limited to, design, constructability, risk and vulnerability, regulatory compliance, and maintainability. The conceptual design packages shall consist of the CDR, a life cycle cost (LCC) estimate (detailed in the DOE Guidance Document GPG-FM-016, *Baseline Development*), and the following additional studies and information:
 - a) Project schedule;
 - b) Risk and vulnerability;
 - c) Maintainability and operability considerations;
 - d) Waste management plans and options;
 - e) Preliminary safety strategy, including a safety analysis report draft;

- f) Preliminary discussion of design strategy for post-operational decontamination and decommissioning;
 - g) Value Engineering (VE) assessment;
 - h) Identification of applicable codes and standards;
 - i) Engineering subsystem trade studies (where appropriate); and
 - j) Process for obtaining DOT certified cylinder overpacks, if pursued.
3. The Life Cycle Cost estimate, expected to be accurate within 20%, shall include funding needs by fiscal year and an analysis of contingency to be applied.
 4. Conceptual design is complete upon resolution and disposition of all DOE comments and the Contractor's issuance of the DOE-approved CDR Packages.

V. Design

A. Preliminary Design

1. The Contractor shall not begin Preliminary Design until the DOE Contracting Officer or designee issues a written notice-to-proceed. Based on the DOE-approved conceptual design, the Contractor shall complete development and preparation of a DUF₆ conversion facility preliminary design for each facility/site (Portsmouth and Paducah).
2. The preliminary design shall include, but not be limited to, the following: conduct of any trade-off studies, including evaluation of alternative designs; complete material (component) balances, including waste and by-product generations, disposal plans, estimates of fugitive emissions and releases; specifications, codes, and standards being applied to equipment and facilities; plant footprint, including land requirements and preliminary siting; identification of early, long-lead procurement items; equipment life design goals and expectations for major equipment items and process lines; special construction materials and planning for corrosion control; analyses of health, safety, and environmental protection; and critical path identification.
3. **Preliminary Design Packages (D-14)**, one for Portsmouth and one for Paducah, using similar formats, shall be prepared. These packages shall include complete bills of material; detailed equipment descriptions, specifications, and process conditions; material and energy balances; process and instrumentation diagrams; refinements of environmental considerations; and waste streams generated. The preliminary design packages shall also report on the status of site-specific permitting. The Contractor shall perform Value Engineering (VE) assessments; an evaluation to ensure that radiation exposures will be as low as reasonably achievable (ALARA analysis); reliability, availability, and maintainability (RAM) analysis; and a constructability review of the project. The safety analysis shall proceed concurrently with the design phase. Complete reviews of all aspects of the project (including drafts of

documents in progress) will be conducted by DOE. The preliminary design packages shall also include the following:

- a) Outline operating procedures,
 - b) Drawing package of in-progress drawings,
 - c) Long-lead procurement listings,
 - d) Outline specifications,
 - e) Alternative analyses or engineering trade studies (in-progress),
 - f) Description of selected technology or process,
 - g) Updated codes and standards of record,
 - h) Updated waste estimates and disposal plans,
 - i) Updated cost estimate for the construction,
 - j) Updated schedule of design and construction,
 - k) Updated configuration management plans,
 - l) Updated System Requirements Document,
 - m) Preliminary safety analysis and assessments (PSAR),
 - n) Permitting update,
 - o) Utility requirements and acquisition plans,
 - p) Risks and vulnerabilities,
 - q) Environmental analyses, and
 - r) VE assessment.
4. Preliminary design is complete upon resolution and disposition of all DOE comments and the Contractor's issuance of the DOE-approved Preliminary Design Packages.

B. Final Design

1. The Contractor shall not begin Final Design until the DOE Contracting Officer or designee issues a written notice-to-proceed. Based on DOE approval of the Preliminary Design Packages by the Contracting Officer or designee, the Contractor shall complete preparation of the DUF₆ **Conversion Facility Design (Final Design) Packages (D-15)**. The Contractor shall produce separate packages of the design and analysis deliverables for each facility (Portsmouth and Paducah), but using the same format. These design packages shall include a description of the conditions, codes, and permits of record for both facilities. A VE study shall be performed at the beginning of final design. The Contractor will use the VE study to improve the approach already defined in the preliminary design packages. The Contractor shall develop independent design packages for the two sites; however, special attention should be paid to utilizing the same auxiliary analyses and evaluations for both sites and taking full advantage of economies of scale in construction and procurement planning. The Contractor shall arrange with DOE for full design reviews at approximately the 60% and 90% completion levels. These reviews shall include operability, constructability, environmental compliance and permitting, regulatory compliance, risk and vulnerability, hazard analysis and controls, bounding consequence analysis, maintainability, as well as all design outputs and

documents prepared as part of the final design effort. At a minimum, the design reviews shall be attended by representatives of the design, construction management, project management, and (planned) facility operations groups and will be conducted for DOE review and approval by the Contracting Officer or designee.

2. The final design packages shall include, but not be limited to, the following: an updated LCC estimate; complete, certified-for-construction design drawings, equipment specifications, data sheets, fabrication drawings, assembly information, and all other materials necessary to advance to the construction stage; estimates of construction labor and material quantities; detailed estimates of construction and installation costs that are expected to be accurate within 10%; and procurement and construction schedules. This package will finalize the plant configuration and establish the basis for configuration management through the construction. The following shall also be included:
 - a) Complete design drawing and specifications packages that are certified for construction;
 - b) Detailed cost estimate for construction and testing;
 - c) Detailed schedule through plant start-up;
 - d) Surveillance plans for large procurement and vendor-supplied modules;
 - e) Construction acceptance testing requirements and plans;
 - f) Special procurement action listings and plans;
 - g) Material receiving and tracking plans;
 - h) Status of permitting for construction and operations;
 - i) Outline operating procedures;
 - j) Updated configuration management plans;
 - k) Remaining technical analyses and uncertainties;
 - l) Utilities requirements and acquisition plans; and
 - m) VE study.
3. Final design is complete upon resolution and disposition of all DOE comments and the Contractor's issuance of the DOE-approved Final Design Packages.

C. Safety Analysis Reports

The Contractor shall prepare Safety Analysis Reports (SARs) that analyze the hazards of operations and identify mitigation strategies and systems to reduce to acceptable levels the potential for damage to equipment, personnel, the public, and the environment from both nuclear and non-nuclear hazards. Separate SARs shall be prepared for Paducah, Portsmouth, and ETTP. The requirements and guidance for the preparation of DOE SARs are detailed in, but may not be limited to the following: 10 CFR-830, DOE Order 5480.21, DOE Order 5480.22, DOE Order 5480.23, DOE Order 420.1, DOE Guide G420.1, DOE Order 440.1, DOE-STD-5502, DOE-STD-1120 through 1027, and DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports* and

as required by the clause entitled “Laws, Regulations, and DOE Directives” in Section I. The SARs will document all hazards—including nuclear, chemical, and natural phenomena hazards—and assess the impact of these events on safety. In this regard, nuclear and non-nuclear hazards shall be treated equally in the safety standards. Non-nuclear hazards shall be evaluated, documented, prevented, and mitigated in the same manner as the nuclear hazards: i.e., the DOE Order 5480.23 hazard class definition shall also apply to the non-nuclear hazards. **Preliminary Safety Analysis Reports (PSARs) (D-16)** shall be delivered at the completion of the preliminary design, at which time the documents will be reviewed by DOE. **Final Safety Analysis Reports (FSARs) (D-17)** shall be developed concurrently with the final design, and progress will be reviewed as part of the routine design reviews conducted by DOE. The Contractor shall provide updates to this plan, as needed.

VI. Cylinder Management

The Contractor shall not begin cylinder management until the DOE Contracting Officer or designee issues a written notice-to-proceed.

A. Transport of Cylinders from ETTP to Portsmouth

The Contractor shall prepare and execute a **Plan to Transport ETTP Cylinders to Portsmouth (D-18)** in accordance with DOT regulations, including obtaining all state and local permits as necessary. This plan is subject to DOE approval by the Contracting Officer or designee prior to execution.

The Plan shall describe the approach for shipment of cylinders of DUF_6 , low-enrichment uranium (LEU) hexafluoride (UF_6), and natural assay UF_6 from ETTP to Portsmouth, as well as the disposition of heel and empty cylinders located at ETTP, by no later than December 31, 2009. This Plan shall include, but not limited to, the following elements:

1. Analysis of transportation options such as (a) obtaining a DOT exemption for nonconforming cylinders, (b) overpacking the cylinders, and (c) transferring of the contents of nonconforming cylinders to certified cylinders for transport;
2. Analysis of transportation modes (e.g., train, truck, barge) and routes for transport of ETTP cylinders to Portsmouth, Ohio;
3. Scheduling and estimation of the cost of transport for the various transportation options and modes;
4. Selection of the preferred transportation option and mode based upon cost effectiveness and safety; and
5. Identify any repairs to UF_6 packagings in accordance with ANSI-N14.1 that would be needed.

NOTE: If cylinder overpacks is the selected transportation option, the activities associated with DOT certification of the overpack design is included the design

activities. Procurement of the necessary number of DOT certified overpacks and/or certified cylinders shall be included under cylinder management activities.

B. Cylinder Information Database (CID) Management

The Cylinder Information Database (CID) (Reference E) contains cylinder characterization, contents, inspection status, S&M activities, and location for the DOE-owned UF₆ inventory at the three sites. The Contractor shall maintain and update CID beginning on the date the Contractor assumes responsibility for cylinder management. The Contractor shall generate cylinder information or cylinder content reports as requested by DOE to support project and program requirements.

C. Three-Site Cylinder Surveillance and Maintenance

1. The Contractor shall perform surveillance and maintenance for the DOE inventory of DUF₆, low-enrichment uranium (LEU) hexafluoride (UF₆), natural assay UF₆, and heel and empty cylinders. DOE will transition management of cylinder S&M to the Contractor for integration into the conversion operations. Six months prior to the Contractor's assuming cylinder S&M activities, the Contractor shall submit to DOE a **Cylinder Surveillance and Maintenance Plan (D-19)**. This plan must have DOE approval by the Contracting Officer or designee. The Contractor shall provide updates to this plan, as needed. This plan must be submitted and approved prior to the Contractor's assuming S&M responsibility and must address the requirements in the following documents:
 - a) The *DOE Implementation Plan for DNFSB Recommendation 95-1* of October 16, 1995;
 - b) *Systems Requirements Document*, K/TSO-001, Rev. 5, dated July 1998 (Section J, Attachment H);
 - c) *Systems Engineering Management Plan*, K/TSO-017, Rev. 3, dated July 1998 (Section J, Attachment I);
 - d) *Engineering Development Plan*, K/TSO-28, Rev. 3, dated July 1998 (Section J, Attachment J);
 - e) *Project Management Plan*, K/TSO-30, Rev. 4, dated July 1999 (Section J, Attachment K);
 - f) Applicable Safety Analysis Reports (References A, C, and D);
 - g) The *State of Ohio EPA Directors Final Findings & Orders*, dated February 24, 1998 (Section J, Attachment E) — meet the requirements and sign the agreement as described in this document prior to commencement of S&M;
 - h) The *State of Tennessee Department of Environment and Conservation Consent Order*, dated February 8, 1999 (Section J, Attachment D); and
 - i) Any other applicable regulatory agreements or orders, including future agreements or orders.

The Site Security Plan (D-10) and the Nuclear Materials Control and Accountability Plan (D-11) must be approved prior to transition of cylinder surveillance and maintenance.

2. Once cylinder S&M activities have been transitioned, the Contractor shall perform all activities necessary to manage the DOE UF₆ cylinder inventory, including required cylinder inspections, maintenance of the existing UF₆ cylinder yards, design and construction of new cylinder storage yards, if required, and disposition empty and heel cylinders. In addition, the Contractor shall be required to take receipt of newly generated USEC DUF₆ cylinders as described in the Memorandum of Agreement (MOA) between DOE and USEC dated June 30, 1998 (Reference F), and transfer in or out other cylinders estimated not to exceed 200 per annum. At the direction of DOE, the Contractor shall disposition LEU or natural assay cylinders (e.g., transfer to other programs).

VII. Procurement of Long Lead Equipment

From the results of the CDR, the Contractor shall prepare and submit to DOE a **List of Major Equipment Items (D-20)** and a **Procurement Plan for Long-lead Items (D-21)**. The Contracting Officer or designee shall issue a notice-to-proceed for procurement of cylinder overpacks, if pursued, if such procurement is required prior to the issuance of the notice-to-proceed for cylinder management. The DOT certificate of cylinder overpack design, if pursued, shall be executed and costed under design activities. The cost of acquiring a fleet of DOE certified cylinder overpacks, if pursued, shall be included under cylinder management. Furthermore, the Contracting Officer or designee shall issue a notice-to-proceed for procurement of any long lead items associated with construction of the facilities if such items require acquisition prior to DOE issuance of the notice-to-proceed for construction. The cost of any long lead items associated with construction shall be included under construction activities.

VIII. Construction

1. The Contractor shall not begin Construction until the DOE Contracting Officer or designee issues a written notice-to-proceed. The Contractor has full responsibility for construction of the conversion facilities at Portsmouth, Ohio, and at Paducah, Kentucky. The Contractor shall obtain all permits for construction, including those required under federal, state, and local environmental compliance regulations and laws.
2. The Contractor shall be responsible for the following tasks:
 - a) Site preparation at Paducah and Portsmouth for construction of the conversion facilities, including disposition and/or use of existing buildings, utilities, and infrastructure necessary to make way for the conversion facility, and construction of any needed buildings, roads, bridges, parking lots, and other infrastructure in support of conversion;
 - b) Materials and labor for utilities and services extension from private or government installations (including telecommunications, firewater, sanitary water, electricity, natural gas, sewage, and railroads);

- c) Materials and labor for construction of the conversion facilities, including fire protection systems, process cooling and heating systems, and supplies;
 - d) Preparation and execution of pre-operational test plans;
 - e) System testing and operational readiness reviews;
 - f) Performing all necessary characterizations;
 - g) Disposal of construction debris and generated wastes during construction;
 - h) Permitting; and
 - i) Preparing and maintaining as-built drawings.
3. The Contractor shall generate a **Construction Management Plan (D-22)**. At a minimum, this plan shall address the following areas:
- a) Temporary construction facilities and utilities;
 - b) Labor availability, recruiting and training;
 - c) Health, safety, fire protection and environmental aspects;
 - d) Warehousing, receiving and protecting of equipment and materials;
 - e) Expediting;
 - f) Quality Assurance;
 - g) Earned value systems;
 - h) Constructibility reviews;
 - i) Cost estimating, cost control, and reporting;
 - j) Schedule and progress reporting;
 - k) Security; and
 - l) Pre-operational testing and operational readiness review
4. DOE will conduct an Operational Readiness Review (ORR) subsequent to the Contractor's completing its pre-operational testing and ORR and certifying the facility as operational. The Contractor shall not introduce process materials into the facility prior to receiving specific approval by the Contracting Officer or designee (after satisfactory completion of the DOE ORR).
5. Construction is complete at the successful completion of punch list items (i.e., ready for Beneficial Occupancy), pre-operational testing, operational readiness reviews (Contractor and DOE ORRs), receipt of as-built drawings, and acceptance by DOE of the conversion facilities.

IX. Conversion Operations

1. The Contractor shall not begin conversion operations until the Contracting Officer or designee issues a written notice-to-proceed following completion of the construction.
2. The Contractor shall safely process DUF₆ cylinders, irrespective of size, shape, condition, and/or contents identified in the Cylinder Information Database (CID), Reference E, and in the Memorandum of Agreement Between the Department of

Energy and the United States Enrichment Corporation, relating to depleted uranium, dated June 30, 1998 (Reference F), at a rate such that the total DUF_6 inventory at all three sites could reasonably be converted and dispositioned in no longer than 25 years after conversion operations start, subject to constraints of projected funding levels.

3. The Contractor shall operate and maintain the facilities in accordance with DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities," requirements of the clause entitled "Laws, Regulations, and DOE Directives" in Section I; and applicable permits and licenses to convert DUF_6 inventory to the selected chemically stable form at the maximum rate possible given the available funding provided by the Government.
4. The Contractor shall be responsible for any pre-conversion confirmation of cylinder contents and conditions necessary to establish that the DUF_6 feed to the conversion plant will meet the Contractor's acceptance criteria for DUF_6 feed. The Contractor also shall be responsible for any characterizations necessary to support applications for and approvals of all required operating permits; to ensure subsequent compliance with environmental regulations and the requirements of these permits; to verify the technical and economic performance of operations; to demonstrate compliance with occupational health and safety ordinances; and to quantify, classify, and certify products, wastes, and fugitive emissions from the conversion facility.
5. The Contractor shall be responsible for the safe, compliant storage of all cylinders and products/wastes until these cylinders, products, or wastes are transported off site and dispositioned (either acceptance and disposal by a licensed waste disposal site or transfer of title to another entity for use/reuse). The Contractor shall provide up to 6 months of on-site storage for empty cylinders and products/wastes generated from conversion. The Contractor shall store radiological waste materials in accordance with DOE Order 435.1 as required by the clause entitled "Laws, Regulations, and DOE Directives" in Section I. Storage and packaging of all reactive fluorine products must conform, as appropriate, to federal, state, and local regulations for chemical hazards.
6. The Contractor shall be responsible for retrieving cylinders from the yards and transporting them to the conversion facilities. The Contractor shall process both good and degraded cylinders in a systematic manner and shall not purposely set aside degraded cylinders.
7. If the DOE or the Contractor identifies no market for either the DUF_6 conversion products or the empty cylinders, these materials shall be processed, packaged, and certified to meet the WAC at the federal disposal facility or at another licensed LLW repository. The processing of empty UF_6 cylinders would include washing, sectioning or crushing, loading into waste containers, and transporting for disposal. If the federal disposal facility is chosen, the Contractor shall transport the material to that site and transfer the material, certified for disposal, to the operating Contractor of federal disposal facility. If another licensed LLW repository is chosen, the

Contractor shall be responsible for all disposition actions. Disposal of the conversion products and the all wastes shall be performed in accordance with all applicable local, state, and federal regulations. Wastes can include the empty cylinders, neutralization products [fluorides of calcium, sodium, and potassium (CaF_2 , NaF , KF)], spent absorbents, solids generated from cylinder-washing operations, contaminated personal protective equipment, contaminated operating equipment and tools, mixed waste, and other incidental wastes. If transuranic waste (as defined in DOE Order 435.1) are generated in the conversion operations and/or cylinder-washing operations, they shall be processed, characterized, packaged, and certified to meet the WAC of the Waste Isolation Project Plant (WIPP).

8. The Contractor shall define how it would deal with a suspension of plant operations caused by unforeseen events such as the inability of the LLW disposal site to receive products. The plan discussed shall allow safe, temporary shutdown without damage to equipment and without causing health, safety or environmental hazards.
9. The contractor shall annually survey and report to DOE the type (identification of radionuclides) and extent of contamination (pCi/cm^2) deposited on the internal and external surfaces of buildings, major process equipment items and interconnecting piping, and other points that may be determined to be prone to contamination accumulation (such as filter housings, effluent discharge points, material handling areas, etc.). The contaminants of concern are the isotopes of uranium ^{234}U , ^{235}U , ^{236}U , and ^{238}U and their daughters, and the contaminants associated with recycled uranium: ^{237}Np , ^{239}Pu , ^{241}Am , and ^{99}Tc .
10. The Contractor shall prepare a **Conversion Facilities Operations and Maintenance Plan (D-23)**. This plan shall incorporate the above responsibilities and be submitted to the Contracting Officer or designee for approval. The Contractor shall provide updates to this plan, as needed. This plan shall include startup, cylinder sequencing, staffing, staff training, shift operations including maintenance, development of procedures, policies for equipment maintenance, and parts replacement and spares.
11. As-Built drawings shall be maintained current throughout the term of this contract.

X. Related Services

In addition to the services specifically described in other provisions of this Statement of Work, the Contractor shall perform services as DOE and the Contractor shall agree in writing that will be performed from time to time under this contract at Paducah, Portsmouth, and/or Oak Ridge or elsewhere, as follows:

- a) Services incidental or related to the services described in other provisions of this Statement of Work; and
- b) Services, using existing or enhanced facilities and capabilities, for the NRC, under agency agreements between NRC and DOE.

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XI. Deliverables

Listed below are the deliverables required in the Statement of Work. Other deliverables are also required in other provisions of the contract.

Deliverable number	Deliverable name	Schedule for deliverable (calendar days after contract award)	Allotted time for DOE review (calendar days after receipt)
D-1	Project Management Plan	60 days	60 days
D-2	Initial NEPA Data	120 days	--
D-3	Updated NEPA Data	with Preliminary Design Package	--
D-4	Regulatory and Permitting Management Plan	90 days	60 days
D-5	Project Quality Assurance Plan	90 days	60 days
D-6	Conversion Product Management Plan	120 days	30 days
D-7	Waste Management Plan	120 days	30 days
D-8	Integrated Safety Management System Plan	120 days	120 days
D-9	Radiation Protection Plan	90 days	60 days
D-10	Site Security Plan	120 calendar days prior to construction start	30 days
D-11	Nuclear Materials Control and Accountability Plan	120 calendar days prior to transition of Cylinder S&M	30 days
D-12	System Requirements Document	See Section F	60 days

Deliverable number	Deliverable name	Schedule for deliverable (calendar days after contract award)	Allotted time for DOE review (calendar days after receipt)
D-13	Conceptual Design Report Packages	See Section F	60 days
D-14	Preliminary Design Packages	See Section F	60 days
D-15	Conversion Facility Design (Final Design) Packages	See Section F	60 days
D-16	Preliminary Safety Analysis Reports	with Preliminary Design Package	90 days
D-17	Final Safety Analysis Reports	with Final Design Package	120 days
D-18	Plan to Transport ETPP Cylinders to Portsmouth	180 days	90 days
D-19	Cylinder Surveillance and Maintenance Plan	180 calendar days prior to transition of Cylinder S&M	30 days
D-20	List of Major Equipment items	with Preliminary Design Package	30 days
D-21	Procurement Plan for Long-Lead Items	per PMP	30 days
D-22	Construction Management Plan	with Final Design Package	60 days
D-23	Conversion Facilities Operations and Maintenance Plan	120 calendar days prior to commencing operations	60 days

XII. References

The following are incorporated into the contract by reference:

- A. SAR: *Paducah Gaseous Diffusion Plant*, KY/EM-174, Volumes 1 & 2, December 1996; and Unresolved Safety Question Determinations (USQD) and Safety Evaluations for Paducah Gaseous Diffusion Plant for September 1995 - August 2000
- B. Paducah, Portsmouth, and East Tennessee Technology Park - Site Maps
- C. SAR: *Portsmouth Gaseous Diffusion Plant*, POEF-LMES-89, Volumes 1 & 2, January 1997; and Unresolved Safety Question Determinations (USQD) and Safety Evaluations for Portsmouth Gaseous Diffusion Plant for 1995 - August 2000
- D. *K-25 Site UF₆ Cylinder Storage Yards Final Safety Analysis Report* dated February 1997; and Unresolved Safety Question Determinations (USQD) and Safety Evaluations for ETTP UF₆ Cylinder Storage Yards for October 1, 1996 - August 31, 2000 (Volumes 1 and 2).
- E. Cylinder Information Database (CID). (The *CID System Documentation* is provided for information and proposal use only and includes "HTML Screen Shot Respective of the Existing CID System" and DRAFT "CID Computer System Design Document.")
- F. MOA between USEC and DOE dated June 30, 1998.
- G. American National Standards Institute (ANSI) N14.1 - 1995, for Nuclear Materials-Uranium Hexafluoride-Packaging for Transport